Greater Convenience: Boston Double Up Food Bucks

12.7% of U.S households (containing 42 million persons) were food insecure at some point during the year and 4.2 % of household respondents in a 2017 food security survey were hungry but couldn't afford to eat at some point during the year (Calise, Spitzer, Schaffer, Wingerter, 2018). The Supplemental Nutrition Assistance Program (SNAP) provides crucial funding for millions of individuals each year as the nation's leading anti-hunger program. SNAP is distributed in the form of a electronic benefits card that allows recipients to buy food and a select variety of beverages.

In 2017, the Healthy Incentive Program (HIP) was launched in Massachusetts. This program provides a dollar-for-dollar match on fresh fruit and vegetable purchases through farmers markets, farm stands, mobile markets, and Community Supported Agriculture (CSA) HIP is meant to dually increase the consumption of produce for low income populations, as well as help to stimulate the local farm economy. However, only half of the targeted areas lacking in food access had the issue mitigated by HIP, suggesting the need for additional support (Coleman-Jensen, Rabbitt, Singh, 2019). The program has proved to be hugely beneficial to SNAP participants and local farmers, yet can still be prohibitive due to required time and access to attend farmers markets or knowledge of CSA programs.

Introduction

The City Of Boston has developed an additional Supplemental Nutrition Assistance Program (SNAP) incentive program, the Boston Double Up Food Bucks (BDUFB). With this program, SNAP recipients are able to get a dollar-for-dollar match for produce purchased at participating corner and non-profit grocery stores. This program is meant to benefit both SNAP recipients, as well as small local

businesses.

Currently, there are four local stores that are eligible for the program: both of the Daily Table locations (Roxbury and Dorchester), F&T Davey's supermarket (Roxbury), and World's Best Food Market & Vegetarian Products (Hyde Park). The purpose of this GIS project has two objectives; 1) analyze the current state of food access in Boston 2) pinpoint potential convenience stores to partner with for the BDUFB program using spatial data based on food access.

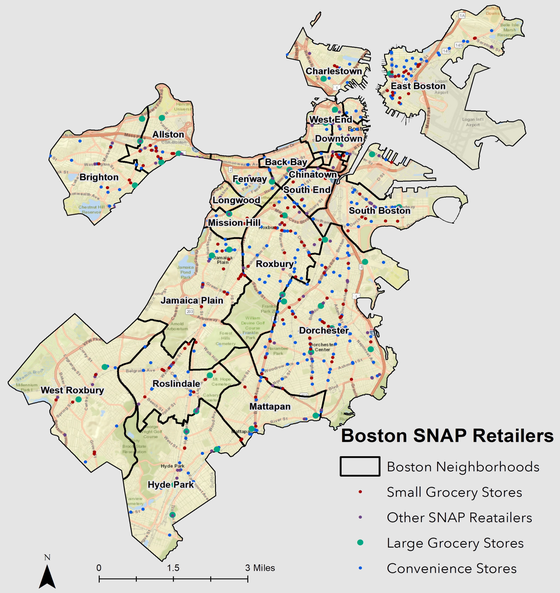

Figure 2: Snap Retailers in Boston Neighborhoods .

Data

For this analysis, we used Census Tract data for Suffolk County from the 2010 Census and the Boston Neighborhoods layer from MASSGIS ; these were both in vector format. Data on SNAP retailers was obtained from United States Department of Agriculture and then coded by retail type in table format. For SNAP households, we obtained a table from American Fact Finder based on American Community Survey data for 2017. The Field " Estimate; Household received Food Stamps/SNAP in the past 12 months" was used.

Table 1: Weighting System of Snap Retailers. This table depicts the weighting system used in the final analysis to create Figure 7. Weights are based on where SNAP participants shop the most according to USDA research.

Retailer Type	Weight
Large Grocery Stores	55%
Convenience Stores	20%
Small Grocery Stores	15%
Other	10%

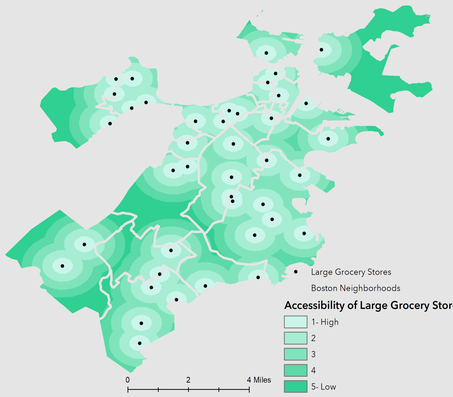

Figure 3: Grocery Stores 2019.

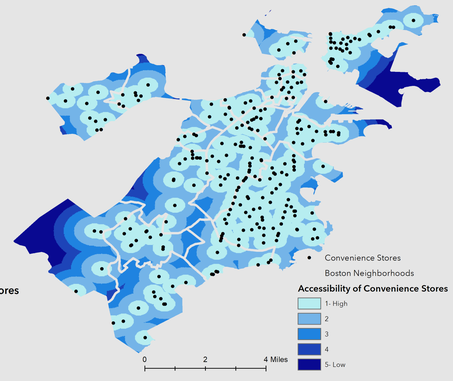

Figure 4: Convenience Stores 2019.

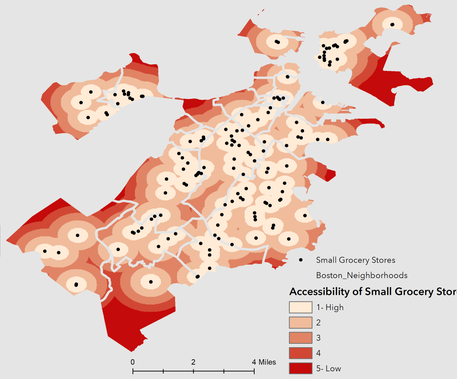

Figure 5: Small Grocery Stores 2019.

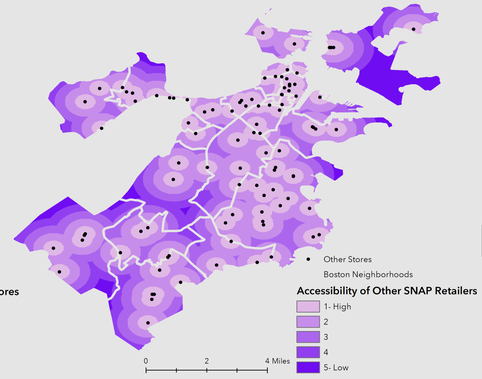

Figure 6: Other Snap Retailers 2019.

Figures 3-6 were created to show the accessibility of each neighborhood of Boston to different food sources. Each layer shows an score based on the Accessibility Index, with 1 being the closest (.25mile).

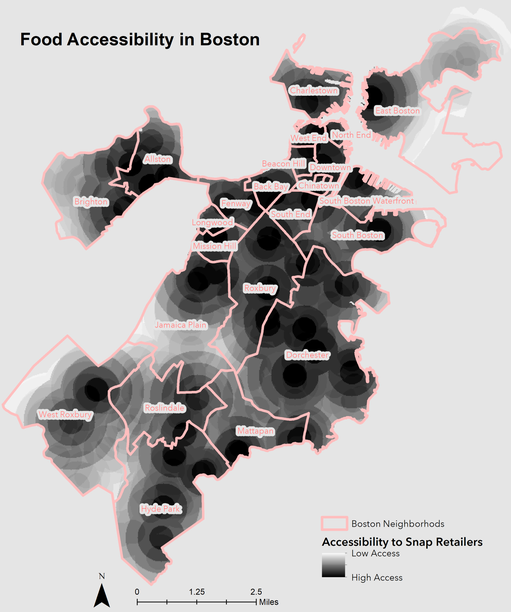

Figure 7: Weighted Analysis of Food Access. Combined using figures 3-6, the weighted analysis depicts areas that have high to low access to SNAP retailers.

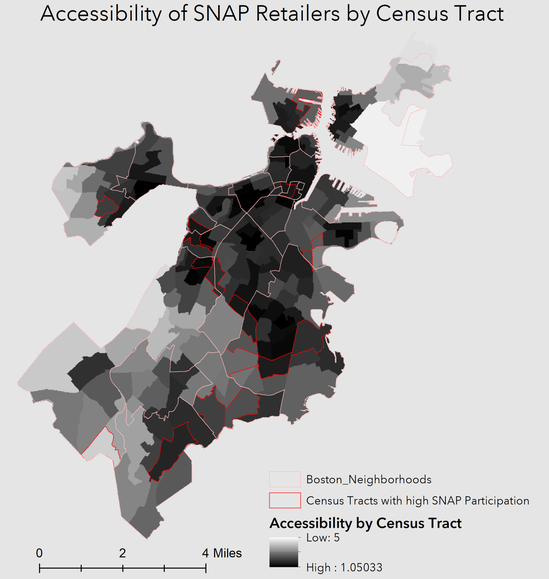

Figure 8: SNAP Retailer Access. Weighted analysis of Boston Food Access combined with the census tracts with the highest amount of SNAP recipients (>610 recipients).

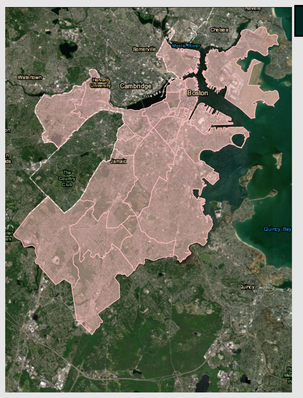

Figure 1: Boston, Massachusetts

Methodology

For this analysis, we used ArcMap 10.7. First, we used the selection tool on the Suffolk County Census Tract layer to just include Boston. We then coded all the retailers in Boston that accept SNAP as either a large grocery store, small grocery store, convenience store, or as other (pharmacies, dollar stores, and department stores). We then created points for these stores using display XY data based on longitude and latitude. Each point layer was then projected as NAD 1983 2011 StatePlane Massachusetts Mainland FIPS 2001. A Euclidean distance was created for each layer using the Euclidean distance tool with Boston Census Tracts as the processing extent. Using the reclassify tool, we reclassified each layer into five different classes, 1(.25mi), 2(.5mi),3(.75mi), 4(1mi), and 5 beyond 1 mile. After the reclassification, we used the extract by mask tool to set the analysis for only our desired area of Boston. This process was repeated for each layer. The raster calculator tool was used with a weighted analysis to combine all of these layers to generate our food access analysis. For Figure 8, we used zonal statistics to map the weighted analysis (figure 7) by census tract and then overlaid this layer with the census tract of highest SNAP participants (>610).

Results

Based on the overlay in Figure 8 of low retailer accessibility and high SNAP participation, the areas that we would recommend to focus on would be in the Western portion of Dorchester by Franklin Park and southeastern portion of Roxbury that borders Hyde Park.

Discussion

Two limitations of this analysis are that we only considered retailers that currently accept SNAP and we did not normalize snap participation by population. The study could be replicated to include all food retailers in Boston since potential BDFUB convenience store partners can apply to accept SNAP benefits. Further, a spatial analysis that includes a network analysis can more accurately assess people's food access as it would take into account walkability and not just proximity. Lastly, the second phase of this study will be to create and implement a survey to stores identified to assess interest in participating in the program, as well as soliciting community feedback about where they would be most likely to shop. This data will complement the spatial analysis and provide further data to make the decision of who to partner with.

References

Calise, T., Ruggiero, L., Spitzer, Natalie, Schaffer, S., & Wingerter, C. (2018). *Evaluation of the Healthy Incentives Program*. *Evaluation of the Healthy Incentives Program*. John Snow Inc Research and Training . Retrieved from https://www.jsi.com/JSIInternet/Resources/publication/display.cfm?txtGeoArea=US&id=22529&thisSection=Resources

Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2018, September). Household Food Security in the United States in 2017. Retrieved from https://www.ers.usda.gov/webdocs/publications/90023/err-256.pdf?v=0.

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Projection: NAD 1983 2011 StatePlane Massachusetts Mainland FIPS 2001.

Data Sources: MassGIS, USDA, American Community Survey 2017